

Remarks:

Reconsideration of the application is requested.

Claims 1-14 and 21-22 remain in the application. Claims 1, 8, and 14 have been amended. Claims 15-20 have been cancelled. Claims 21-22 have been added.

Support for the subject matter of the newly added claims 20-22 can be found in the second paragraph on page 2 of the instant application.

In item 2 on page 2 of the above-identified Office action, claims 1-20 have been rejected as being indefinite under 35 U.S.C. § 112, second paragraph.

More specifically, in item 3 on page 2 of the Office action, the Examiner has stated that the phrase "at least with a relatively low etching rate" in claims 1, 8, and 14 is a relative term which renders the claims indefinite. The phrase "at least with a relatively low etching rate" has been deleted from the claims.

In item 4 on page 2 of the Office action, the Examiner has stated that the phrase "of the electrode configuration" in lines 10-11 of claim 1, renders claim 1 indefinite. The

phrase "of the electrode configuration" in lines 10-11 of claim 1 has been deleted.

In item 5 on page 3 of the Office action, the Examiner has stated that the phrase "the first structured layer" in claim 14 has insufficient antecedent basis. The appropriate correction has been made to claim 14.

Furthermore, claims 8 and 14 have been re-written to be dependent on claim 1.

It is accordingly believed that the claims meet the requirements of 35 U.S.C. § 112, second paragraph. Should the Examiner find any further objectionable items, Counsel would appreciate a telephone call during which the matter may be resolved. The above-noted changes to the claims are provided solely for the purpose of satisfying the requirements of 35 U.S.C. § 112. The changes are neither provided for overcoming the prior art nor do they narrow the scope of the claims for any reason related to the statutory requirements for a patent.

In item 7 on page 3 of the Office action, claims 1-7 and 14-20 have been rejected as being obvious over *Shinkawata* (US 5,717,236) in view of *Chung* (US 5,976,394) under 35 U.S.C. § 103.

In item 8 on page 4 of the Office action, claims 8-9 and 12-13 have been rejected as being obvious over *Shinkawata* and *Chung* in view of *Summerfelt* (US 5,585,300) under 35 U.S.C. § 103.

In item 9 on page 5 of the Office action, claims 10-11 have been rejected as being obvious over *Shinkawata*, *Chung*, and *Summerfelt* in view of *Yang et al.* (US 5,436,190) under 35 U.S.C. § 103.

As will be explained below, it is believed that the claims were patentable over the cited art in their original form and the claims have, therefore, not been amended to overcome the references.

Before discussing the prior art in detail, it is believed that a brief review of the invention as claimed, would be helpful.

Claim 1 calls for, inter alia:

forming a first conductive layer of a material which is substantially unetchable by chemical dry-etching;

forming a second conductive layer on the first conductive layer from a material which is etchable by chemical dry-etching;

structuring the second conductive layer to form a structured second layer; and

dry etching the first conductive layer while using the second structured layer as a mask.

In item 7 on page 3 of the Office action, the Examiner stated that:

- Shinkawata discloses an electrode configuration ... in which a first conductive layer (15) is formed on a second conductive layer (16) (col.16, lines 55-68),
- Shinkawata inherently teaches that the first conductive layer is unetchable to chemical dry etching because the material for the first conductive layer is similar as the instant application (see lines 18-21 at page 15 of the instant application), and
- the first conductive layer is formed using the structured second conductive layer (figure 6)

In col. 16, line 55, through col. 17 line 2, lines 57-59, Shinkawata states that:

Sequentially ... on the upper surface of the second interlayer insulating film 11 ..., a barrier layer 15 as a diffusion suppression layer, and a lower electrode 16 are formed successively As the material of the barrier layer, a Ti derivative laminate film such as TiN/Ti is used. As the material of the lower electrode 16, since it is necessary to form a base layer enabling crystal growth of a thin film of ferroelectric (or high dielectric), it is necessary to use a metal film such as Pt, Pd, Rh, Ni, and W, an alloy film of Pt, Pd,

Rh, Ni, and W, and metal laminate films such as Ru/RuO₂ and Ir/IrO₂."

In lines 18-24 on page 15 the instant application states:

A further **platinum layer 6** is applied to the barium strontium titanate layer 5 as **first conductive layer** of the electrode configuration according to the invention. Then, a **titanate nitride layer 7** is produced, as **second conductive layer** of the electrode configuration 10 according to the invention, on the platinum layer 6.

In *Shinkawata* the TiN/Ti barrier layer 15 is formed on top of the interlayer insulating film 11 before the lower electrode 16 is formed on top of the TiN/Ti barrier layer 15 (see also Fig. 6 of *Shinkawata*). In contrast, in the present application (as stated in the specification and as recited in the claims) the TiN layer is formed on top of the already formed first conductive layer 6. In other words, the layers in *Shinkawata* are the other way round and formed in a different sequence. Hence, the TiN/Ti barrier layer 15 in *Shinkawata* **is not** and **cannot** be used to etch the lower electrode 16. The TiN/Ti barrier layer 15 in *Shinkawata* is used as a diffusion suppression layer and not as an etching mask for dry etching an underlying Pt layer.

For the above-noted reasons each one of Examiner's assertions regarding the teachings of *Shinkawata* are believed to be incorrect.

The Examiner cites the secondary reference *Chung* for teaching "that it is conventional to use a reactive gas such as an inert gas (argon) or a mixed gas such as CL_2 /Ar for efficiently etching platinum (col. 1, lines 27-40)." (last sentence on page 3 of the Office action). The Examiner cites the secondary reference *Summerfelt* for disclosing "that an insulation layer of silicon oxide is deposited over the electrode configuration [and] structured to form a contact hole and then the contact hole is filled with a conductive layer". (sentence bridging pages 3 and 4 of the Office action).

Considering the deficiencies of the primary reference *Shinkawata*, it is believed not to be necessary at this stage to address the secondary references, and whether there is sufficient suggestion or motivation with a reasonable expectation of success for modifying or combining the references as required by MPEP § 2143.

The inventive concept of the invention of the instant application is to dry etch a layer of a material which is practically unetchable by chemical dry-etching, using as a

mask a structured layer which is etchable by chemical dry-etching. The cited references neither suggest nor contain the relevant teaching which would suggest such a process.

Therefore, the invention as recited in claim 1 of the instant application is believed not to be obvious over the references.

It is accordingly believed to be clear that none of the references, whether taken alone or in any combination, suggest the features of claim 1. Claim 1 is, therefore, believed to be patentable over the art and since claims 2-14 and 21-22 are ultimately dependent on claim 1, they are believed to be patentable as well.

In view of the foregoing, reconsideration and allowance of claims 1-14 and 21-22 are solicited.

Please charge any fees which might be due with respect to
Sections 1.16 and 1.17 to the Deposit Account of Lerner and
Greenberg, P.A., No. 12-1099.

Respectfully submitted,

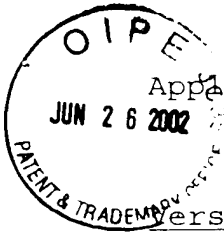

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Applic. No. : 09/645,807

Version with markings to show changes made:

Claim 1 (amended). A method of producing an electrode configuration, which comprises the following steps:

forming a first conductive layer of a material which is substantially unetchable by chemical dry-etching;

forming a second conductive layer on the first conductive layer from a material which is etchable[, at least with a relatively low etching rate,] by chemical dry-etching;

structuring the second conductive layer to form a structured second layer; and

dry etching the first conductive layer [of the electrode configuration] while using the second structured layer as a mask.

Claim 8 (amended). [A method of electrically contacting an electrode configuration, which comprises the following steps:

forming an electrode configuration with a first conductive layer of a material which is substantially unetchable by chemical dry-etching, and a second conductive layer on the first conductive layer formed of a material which is

etchable[, at least with a relatively low etching rate,] by chemical dry-etching;] The method according to claim 1, further comprising:

applying at least one insulation layer on the electrode configuration, and structuring the insulation layer to form at least one contact hole to the electrode configuration; and depositing a conductive layer and filling in the contact hole.

Claim 14 (amended). [A method of producing an electrode configuration, which comprises the following steps:

forming a first conductive layer of a material which is substantially unetchable by chemical dry-etching;

forming a second conductive layer on the first conductive layer from a material which is etchable, at least with a relatively low etching rate, by chemical dry-etching;

structuring the second conductive layer to form a structured second layer; and

subsequently forming an insulation layer on the second conductive layer.] The method according to claim 1, further comprising chemical dry etching the second conductive layer while using the first structured layer as a barrier for the chemical dry-etching.